

## CLAIMS

1. A centrifugal compressor comprising:  
a centrifugal impeller rotatable on an axis and having impeller vanes extending from an inlet end for fluid entry into the impeller;  
a compressor housing surrounding the impeller and defining  
5 therewith an annular fluid flow passage, the housing having an inlet protruding beyond the impeller inlet and configured for generally axial inlet flow and an outlet configured for generally radial outlet flow;  
an inlet member attached to the housing inlet and forming an extension configured for generally axial inlet flow into the housing; and  
10 a separate channel ring fixed within the housing inlet and forming therewith an annular recirculation channel extending from the inlet member to beyond the impeller inlet end, the channel formed with a smoothly diminishing annular cross section from a first slot at a forward end of the channel adjacent the inlet member to a second slot at a rearward end  
15 of the channel beyond the impeller inlet end.
2. A centrifugal compressor as in claim 1 wherein the channel ring is supported in the housing by spaced radial connectors extending across the channel.
3. A centrifugal compressor as in claim 2 wherein the connectors are radial struts carried by the channel ring and extending into slots of the housing inlet.
4. A centrifugal compressor as in claim 2 wherein the connectors are positioned axially near a forward end of the channel ring.

5. A centrifugal compressor as in claim 1 wherein the channel ring has an aerodynamic cross section.

6. A centrifugal compressor as in claim 1 wherein the forward end of the impeller is positioned closer to the second slot than to the first slot.

7. A centrifugal compressor comprising:  
a centrifugal impeller rotatable on an axis and having impeller vanes extending from an inlet end for fluid entry into the impeller;  
a compressor housing surrounding the impeller and defining  
5 therewith an annular fluid flow passage, the housing having an inlet protruding beyond the impeller inlet and configured for generally axial inlet flow;  
an inlet member attached to the housing inlet and forming an extension configured for generally axial inlet flow into the housing; and  
10 a separate channel ring fixed within the housing inlet and forming therewith an annular recirculation channel extending from the inlet member to beyond the impeller inlet end, the channel formed with a smoothly varying annular cross section from a first slot at a forward end of the channel adjacent the inlet member to a second slot at a rearward end of  
15 the channel beyond the impeller inlet end.

8. A centrifugal compressor as in claim 7 wherein the channel ring has an aerodynamic cross section.

9. A centrifugal compressor as in claim 7 wherein the channel ring is supported in the housing by spaced radial connectors extending across the channel.